affirmed that these "tuberculous antitoxines" had no poisonous action. Prof. Maragliano concluded by considering the harmful influence of pregnancy upon phthisis, and recommended it, when occurring in a phthisical person, to be terminated artificially. Many other interesting papers, for which we cannot find room here, were read in this section.

Section V.—Sanatorium Treatment.—Since this tuberculosis congress was the first of its kind, it is difficult, if not incorrect, to speak of any part of it as being a novel feature, but the relative newness of the sanatorium treatment of consumption rendered this Section the most interesting one of the whole congress. As these notes are intended for lay as well as professional readers, perhaps it would not be waste of time and space to discuss what is meant by the sanatorium treatment. It seems to the writer that all that is meant by sanatorium treatment is the placing of patients suffering from phthisis in its different stages in an institution or house where they can be constantly watched by skilled doctors, and where every appliance for rest and exercise and amusement in pure and dry open air, forced feeding ("ubernährung"), and hydrotherapy exist. So much has been said about open-air treatment, Nordrach treatment, and so on, that the more general one's remarks are here the better. If a personal name is to be attached to sanatorium treatment it ought to be that of Brehmer, whose book still remains the classic and, indeed, to all intents and purposes the only book upon the subject. If it is wished to label this treatment with the name of a place, it ought to be called the Görbersdorf treatment, for there in Upper Silesia Brehmer founded his institution, and there it thrives today. It must always be remembered that open air is, although an important part, only a part of the whole, insistance upon the food question, and proper and suitable medicines, including alcohol, and above all, the adaptation of all these means to the daily and even hourly fluctuations of the patient, are essential factors in the sanatorium treatment.

The subject matter of the Section was introduced by a paper of Prof. Leyden's, who sketched the development of the sanatorium question. Herr Schmieden (Berlin) read a paper upon the building and arrangement of sanatoria. Dr. Schultzer (Berlin) discussed the arrangement, management and results of sanatorium treatment. The author reckoned the cost of a sanatorium for 120 beds at 3*s*. per diem per patient. He pointed out that the results obtainable from treatment could be greatly improved by the construction of intermediate sanatoria, to which patients almost cured could go and get occupation while being still, to some extent, under treatment. Dr. Edward Kaurin gave an interesting account of the sanatoria for tuberculous patients in Norway. The largest sanatorium is situated on the sea coast, and apparently great attention is paid to diet, for each patient consumes more than two quarts of milk per diem, and about three ounces of butter, in addition to his ordinary meals. The cost per head is 1·20 kronen. Prof. Ewald treated the subject of sanatoria for children. Dr. Rufenacht Walters read a paper on the hygienic dietetic treatment of phthisis in Great Britain. The author emphasised the fact that open-air treatment, combined with increased diet, had long been practised in this country with success. He described shortly the hospitals, convalescent homes, &c., where this treatment had been followed. He pointed out the importance of the modern movement in this country for systematising the struggle against tuberculosis, and concluded with a few pregnant remarks concerning climate in the treatment of tuberculosis, and the necessity for improving the general mode of life of tuberculous patients. Dr. Sinclair Coghill made a communication upon the treatment of phthisis, in which he described the National Hospital for Consumption at Ventnor and the methods practised there.

Many other papers followed in this Section, giving the results at sanatoria situated in the most varied regions, and also discussing the difficulties to be met with and overcome in each country in impressing the hygienic treatment of tuberculosis upon the populace in general. National prejudice and customs, to some extent, perhaps, masked in robust health by the voluntary control of the individual, come very obviously to the surface in disease. The German, disciplined from the cradle to the grave, finds it much less hard to submit to the strict *régime* of the sanatorium than the Englishman, in whose eyes, perhaps, the advantages of individual liberty are somewhat over-estimated.

In these notes, filled with the business of the congress, no space is available even to enumerate its pleasures; suffice it to say that the congressists found ample recreation provided for them by the respective authorities in the evening, and returned refreshed by it to their somewhat depressing subject-matter in the morning.

F. W. TUNNICLIFFE.

NOTES.

THE award of the sixth De Morgan medal was made by the Council of the London Mathematical Society on Thursday last, June 8. The medallist is Prof. W. Burnside, F.R.S., and the ground of his selection was for his researches in mathematics, particularly in the theory of groups of finite order.

THE death is announced of Dr. L. A. Charpentier, Professor and Fellow of the Faculty of Medicine, Paris, and member of the Academy of Medicine.

THE German Imperial School for the study of tropical diseases, the establishment of which is due to the suggestion of Prof. Koch, is to be settled at Hamburg.

MR. W. MARTINDALE has been elected president of the Pharmacutical Society of Great Britain.

MR. STANDEN, Government Quinologist, Madras, has been deputed to visit Java to study the system of planting cinchona and manufacturing quinine there, and will therefore be absent for some months. It is proposed by the Madras Government to considerably extend the cinchona plantations on the Nilgiris, and a large area has recently been cleared close to the Pykara Falls.

MR. H. J. MACKINDER, reader in geography at the University of Oxford, has just left England in charge of an expedition, the object of which is to make a thorough study of Mount Kenia, in British East Africa.

As already announced, the autumn meeting of the Iron and Steel Institute will be held at Manchester on August 15–18. The preliminary programme shows that numerous visits to engineering and other industrial establishments have been arranged. Receptions will be given by the Lord Mayor of Manchester and the Mayor of Salford. A detailed programme will be issued when the local arrangements are further advanced. This programme will contain a list of the papers that are expected to be read.

THE Société helvétique des Sciences naturelles will meet at Neuchâtel on July 31–August 2. On the first day, discourses will be delivered by the president, Prof. Maurice de Tribolet, Prof. Roux, Dr. C. E. Guillaume, and Dr. L. Wehrli. On the following day, the various sections will meet, and on August 2 there will be discourses by Prof. Schröter, Dr. Morin, and Prof. R. de Girard. A number of excursions have been arranged, and there is every promise of the meeting being a successful one. The secretary is Prof. Dr. Henri Rivier, Neuchâtel, Vieux-Châtel 11.

WE learn from the Allahabad *Pioneer Mail* that some important changes are being made in the Meteorological Department of the Government of India. These comprise the abolition of a number of observing stations which have not proved worth keeping up, and the substitution for them of others in more favourable localities. Of the latter, most important are stations which are to be established at Cherapunji and one or two other places in Assam, which will enable a more careful watch to be kept over the meteorology of the tea districts, also regarding the periodical rise and fall of the rivers which are so important for the jute trade. Arrangements are also being made, but are not yet concluded, for the establishment of an observatory on Dodabatta Peak, the highest point in the Nilgiris, which is likely to be valuable in connection with the warnings of the monsoon.

THE preliminary programme of the eighteenth congress of the Sanitary Institute, to be held in Southampton, from August 29 to September 2, has now been issued. The president of the congress is Mr. W. H. Preece, K.C.B., F.R.S. Mr. Malcolm Morris will deliver the lecture to the congress, and Bailie J. Dick, chairman of the Health Committee, Glasgow, will deliver the popular lecture. Excursions to places of interest in connection with sanitation will be arranged for those attending the congress. A conversazione will be given by the Mayor (Councillor G. A. E. Hussey). The congress will include three general addresses and lectures. Three sections will meet for two days each, and deal with (1) sanitary science and preventive medicine, presided over by Sir Joseph Ewart; (2) engineering and architecture, presided over by Mr. James Lemon; (3) physics, chemistry and biology, presided over by Prof. Percy F. Frankland, F.R.S. There will also be eight special conferences.

A PARLIAMENTARY paper has just been issued showing the number of experiments performed on living animals during 1898, under licences granted under the Act 39 and 40 Vict., c. 77, distinguishing painless from painful experiments. Nearly all the experiments made under the certificate which dispenses with the obligation to kill the animal before recovering from anæsthesia, have been inoculations made (under anæsthetics upon rodents) with the object of diagnosing rabies. During the past three years, the number of experiments other than those of the nature of inoculations, hypodermic injections or similar proceedings has shown little variation (1516, 1462, 1511), while those of that character have increased (5984, 7360, 7640). Many of these latter experiments are performed in the course of professional duty for the diagnosis of disease, the preparation of antitoxins, the testing of water, and so forth. During the past year 43,000 doses of diphtheria antitoxin have been issued from two institutions.

THE second biennial engineering conference, held at the Institution of Civil Engineers last week, was opened by the president, Mr. W. H. Preece, K.C.B., F.R.S. This conference was not an international one in the sense of that held at Chicago in 1893, or of that which is contemplated in the year 1901 in Glasgow, in connection with the exhibition to be held there, but it may well be Imperial; and in furtherance of this idea the president suggested that, at the next conference, the Council should take measures to secure the presence of some members, delegated specially to represent engineering in parts of the British Empire beyond the seas. In the course of his address, the president remarked: "Science has followed, it has not led engineering. It is their intimate association which is the foundation of all industrial progress. The war of the microbes, the latest development of biology, is a consequence of sanitary requirements. Our knowledge of the diffusion of molecules and the solution of solids has sprung from the investigation into the mechanical properties and constitution of iron and its alloys, and the disturbances of the æther are becoming familiar through the practice of the so-called wireless telegraphy. Facts are derived from accident, observation or practice; laws are the result of research. Engineers have always appreciated science up to the hilt, but they wish that its special votaries were less dogmatic and more modest." Appreciative reference was made to the work of investigators like Newton, Faraday, Lord Kelvin, Lord Armstrong, Lord Lister and Lord Rayleigh; otherwise the remarks quoted would convey the impression that purely scientific investigations, such, for instance, as were made by Faraday, Clerk Maxwell, and Hertz, had followed instead of preceded advances in applied electricity.

THE U.S. Congress has shown appreciation of the valuable work accomplished by the Department of Agriculture by providing increased funds for many of the bureaus and divisions. We learn from the *Experiment Station Record* that the grant recently made by Act of Congress provides an increase of nearly 200,000 dollars over last year, and of more than half a million dollars over the year previous, the total appropriation for the closing fiscal year of the century being 3,726,022 dollars. This includes 720,000 dollars for the agricultural experiment stations in forty-eight States and territories, and a special grant for the establishment and maintenance of experiment stations in Alaska. The largest increases in appropriation are for the Weather Bureau and the Bureau of Animal Industry. The total grant for the Weather Bureau is 1,022,482 dollars, which includes an increase of 60,000 dollars for the maintenance of the new stations in the West Indies and adjacent coast, and 25,000 dollars for the erection of an addition to the present buildings of the Bureau in Washington. The total appropriation for the Bureau of Animal Industry is 1,044,030 dollars. This includes 50,000 dollars additional for investigations and inspection, and 20,000 dollars "for the purchase and equipment of land in the vicinity of Washington for an experiment station for the study of the diseases affecting the domesticated animals." The fund for irrigation investigations has been increased to 35,000 dollars. A grant of 10,000 dollars has been made for tobacco investigations, including the mapping of tobacco soils; study of soils and conditions of growth in Cuba, Sumatra and other competing countries; investigations of the methods of curing, with particular reference to fermentation; and originating improved varieties by means of selection and breeding. The Division of Chemistry receives 34,000 dollars—an increase of 5300 dollars—2500 dollars of which is for the equipment of a new laboratory. These additional grants will materially strengthen the Department of Agriculture and extend its sphere of usefulness.

THE process of manufacturing mechanical wood pulp is described by Mr. W. A. Hare in a volume just received, containing papers read before the Engineering Society of the School of Practical Science, Toronto. Within the past two or three years there has been a marked impetus given to the pulp and paper industry in Canada. Wood pulp will, for many years to come, be used to supply the world's demand for a filler in the manufacture of paper, in many of the coarse grades of which it is the only constituent. It is not confined, however, to the manufacture of paper alone, but is made into many useful articles of daily service, the market for which is increasing rapidly. No country in the world is better adapted than Canada for the establishment and expansion of wood pulp manufactures; and a prosperous future may be anticipated for the industry.

THE report of Mr. W. E. Plummer, Director of the Liverpool Observatory, upon the observations made during 1898, has been issued by the Mersey Docks and Harbour Board.

The results of astronomical and meteorological observations are recorded, and mention is made of the latest addition to the equipment of the observatory—namely, a seismograph, which has been placed in the basement, upon the solid rock which forms the foundation of the observatory. The instrument recorded a disturbance on September 17, 1898, probably having its origin in an earthquake near Tashkent, and it also registered movements produced by an earthquake at Port-au-Prince on December 29. Mr. Plummer hopes that during the year he will be able to trace the effects of tidal motion in the estuaries of the Dee and Mersey upon the seismograph in the observatory.

FROM an intemperate article in the *Journal of Indian Engineering* we learn of a regrettable state of feeling in Hong Kong concerning the comparative efficiencies of the Kowloon Observatory, of which Dr. Doberck is director, and the Jesuit Observatories of Manila and Zi-ka-wei. The Jesuit Fathers have long sent telegraphic messages connected with weather forecasts and storm warnings to the Spanish Consuls in Hong Kong, Shanghai and Singapore, who have forwarded the intelligence to the various newspaper offices in the respective districts, where they have been published for the benefit of the public at large. It is contended on behalf of the Jesuits that this voluntary service was of the greatest assistance to the mercantile marine and commerce of those ports: that the work was well organised and accurate and deserving of support and encouragement. But it is also alleged that the Secretary of War of the United States has peremptorily forbidden the despatch of these meteorological telegrams to any place outside the Philippines, and that this action has been put into operation on an appeal from Dr. Doberck. The charge uttered against Dr. Doberck is that he has used his influence with the U.S. Weather Bureau to move the Secretary of War (now the governing authority in Manila) to suppress the Jesuits' correct telegrams in order that his own forecasts may pass unchallenged. But surely the public can test the accuracy and value of weather forecasts, with or without any assistance from the Manila authorities. It is ill-judged policy to limit the distribution of any scientific information; and as in the present case the work is done voluntarily by the Jesuit Fathers, it is difficult to understand why the issue of the weather despatches has been forbidden.

DURING the last week of May, Mr. Walter Garstang, of the Marine Biological Association, carried out the second of his periodical surveys of the biological and physical conditions of the western region of the English Channel. The steam-tug *Stormcock* was again employed, and the same stations were visited as in February, viz., mid-Channel (50 fathoms), Ushant (60 fathoms), Parsons Bank, 50 miles W.N.W. from Ushant (75 fathoms), and Mounts Bay (45 fathoms). The distribution of temperature presented several noteworthy features. At the Ushant station, in spite of the depth of water, the temperature was found to be uniformly high from top to bottom; but at all other stations a surface layer of warm water overlay a deeper mass of cooler water. This warm surface layer was 7 fathoms deep in Mounts Bay, 10 to 15 fathoms deep in mid-Channel, and 15 to 20 fathoms deep over Parsons Bank. The temperature at 5 fathoms depth was 53°·0 F. in mid-Channel, 53°·2 in Mounts Bay, 54°·1 off Ushant, and 54°·5 at Parsons Bank. Rich collections of plankton were made at all stations in a variety of ways. The apparatus employed consisted of a surface tow-net, a fine vertical net after Hensen's pattern and a pump and 40 fathoms of hose for quantitative work, and a new form of opening and closing net for towing horizontally at any required depth. By means of this net many interesting features in the vertical distribution of plankton at the different stations were brought to light. Among the more interesting forms captured during the cruise may be mentioned the medusa *Hybocodon prolifer* (mid-Channel, and Mounts Bay, 40 fathoms), the siphonophore *Agalmopsis* (Parsons Bank, upper strata), the copepod *Isias clavipes* (Ushant, 3 fathoms), *Tornaria*, the larva of *Balanoglossus* (Parsons Bank, surface), and the eggs and larvæ of the pilchard (Ushant, 60 fathoms, and at the surface at all stations except Mounts Bay).

THE director of the National Observatory of Athens has published (1898) a first large quarto volume of its *Annals*, containing (1) an elaborate discussion of the meteorological observations made from 1839 to 1893, and (2) the detailed observations for the years 1894 and 1895; for the latter year, observations are given for every hour, and means are calculated for daily, ten-daily, monthly and yearly periods. The present observatory was regularly established in 1840, at the expense of Baron Sinas, and he also supplied it with the necessary instruments. The first director was Prof. G. Bouris, and the present director is Prof D. Eginitis. As now constituted, the observatory is divided into three sections: astronomy, meteorology and geodynamics, with a separate chief for each service, under the general superintendence of the director. From this long series of observations we note that the maximum temperature recorded was 105°·3, and the mean of the maxima 100°·2; the minimum was 19°·6, and the mean of the minima 29°·1. The average yearly rainfall (1858–94) was 16 inches; the driest month is July, and the wettest months November and December. The number of rainy days averages 99 in the year. In addition to the statements referring to observations made with instruments during the present century, the author gives, under each section, some interesting quotations relating to the ideas and observations of ancient Greek and Latin writers. Many characteristics of the climate of Greece are contained in almanacs dating from the fifth century B.C., and they are frequently found to confirm the results deduced from modern observations.

WE have received from Prof. H. Mohn, Director of the Norwegian Meteorological Service, a pamphlet on the employment of the boiling point thermometer in determining the pressure of the air and the correction for gravity. As recommended by recent meteorological conferences, the correction for gravity is now generally applied or quoted in meteorological tables. But the correction calculated according to formulæ differs more or less from that determined by actual pendulum experiments, and there are comparatively few meteorological stations where such experiments have been made. It is therefore important for meteorologists to find another means of determining this correction, and in the work in question Prof. Mohn publishes the results of experiments made at a number of land stations; and he shows that the correction for gravity may be very accurately determined by the improved thermometers used in conjunction with a mercurial barometer, the difference of the reduced readings being the correction required. It will be interesting to find whether the methods proposed could be employed at sea; at all events, a comparatively smooth sea would be necessary for the experiments.

AN "Annual Review of Physics," by M. Lucien Poincaré, is a valuable feature of the *Revue générale des Sciences* for May 30. It contains a summary of the chief discoveries made by physicists during the past year, classified under their various headings. Speaking of progress generally, it is pointed out that our knowledge of physics has not been revolutionised by any epoch-making discoveries like those of Röntgen and Zeeman, but that the year has been spent chiefly in extending and completing the knowledge of known phenomena.

THE latest researches on the propagation of malaria, by Prof. Grassi, in conjunction with Bignami and Bastianelli, show that all the species of the genus *Anopheles* hitherto observed by the writers are capable of transmitting this disease. Experiments bearing on the hereditary transmission of the disease among the mosquitos themselves have hitherto led to negative results. Specimens of *Anopheles claviger* have been bred from parents taken in malarial houses, but no sporozooids have been observed in their salivary glands. Moreover, several observers have allowed themselves to be freely bitten by newly-bred mosquitos taken from malarial districts, but in no case have any ill effects been experienced. The present evidence tends to show that those *Anopheles* which have not bitten malarial patients are not infected, and are incapable of inoculating the disease; a single positive result would, however, disprove this conclusion.

MR. STEWART CULIN still continues his interesting comparative studies of games; and in the *Bulletin* No. 3 of the Free Museum of Science and Art, Philadelphia, 1898, he discusses the "platter" or dice of the American Indians, and finds that they originated from arrows and a throwing-stick used for divinatory purposes. He is of opinion that all the various forms of the game are not only derived, one from another, but that its place of origin may be definitely fixed in the country of the reed arrow and the *atlatl*, or throwing-stick; that is, in the arid region of the South-Western United States and Northern or Central Mexico.

VARIOUS items of Indian folk-lore will be found in the *Journal of the Asiatic Society of Bengal*, vol. lxvii. Çarat Candra Mitra writes on Bengali and Behari bird folk-lore and omen birds. The same author has a paper on coincidences between some Bengali nursery stories and South Indian folk-tales, in which he discusses the migration of folk-tales, and concludes as follows: "The similarity between the Bengali and South Indian versions of these tales can be accounted for only on the supposition that the aboriginal Bengali and Dravidian races assimilated the tales from Aryan settlers, the slight variations between the said two versions being due to the difference between the two borrowing races as regards manners, customs and language." Astronomical folk-lore is narrated by Ramgharib Chaube.

THE fourteenth fasciculus of the "North American Fauna," under the editorship of Dr. Merriam, is devoted to the biology of the Tres Marias Islands, the larger portion of the text being by Mr. E. W. Nelson. These islands, which lie off the west coast of Mexico, about sixty-five miles from the port of San Blas, have only recently been systematically explored by collectors. As might have been expected, this exploration clearly demonstrates their continental origin, their situation showing that at one period after their separation they formed a single larger island. The birds and mammals seem to have been more susceptible to modifying influences than has been the case with other groups, seven out of ten representatives of the latter, and twelve out of thirty-six of the former, being regarded as entitled to specific or sub-specific distinction.

MR. NELSON has likewise been devoting attention to the squirrels of the mainland of Mexico and Central America, the results of his investigations appearing in the May issue of the *Proc. Washington Academy*. It is concluded that the arboreal squirrels of North America should be divided, from the characters of the skull, aided sometimes by external peculiarities, into ten distinct sub-generic groups, four of which receive new names. The sub-genera are stated to occupy clearly defined geographical areas—a fact which speaks clearly as to their intrinsic importance; and it is further noticeable that the ranges of the most closely allied groups are invariably separated from one another by distinct gaps. Considerable importance as a group-character is attached to the presence or absence of the anterior upper premolar, and its relative size when developed.

IN his paper on "Mid-winter Surface and Deep Tow-nettings in the Irish Sea," recently published in the *Trans. Liverpool Biol. Soc.*, Mr. I. C. Thompson urges the importance of correlating the gatherings taken from upper and lower strata at the same time, much remaining to be learnt as to the effects of temperature and other influences upon the minute forms of marine life.

IN the *Bol. Mus. Paraense* for December last, the energetic director of the museum, Dr. E. Goeldi, laments the unsatisfactory state of our knowledge of the Brazilian fish-fauna, mentioning at the same time that although it is a subject to which his attention has long been directed, means and opportunity have been lacking. A commencement is, however, now made in the present synopsis of the fishes of Amazonia and the Guianas, which includes nearly forty pages of text, and a double coloured plate. The excellent execution of two of the figures in the latter, representing species recently described by Mr. Boulenger, is a very satisfactory feature.

THE April number of the *Agricultural Gazette of New South Wales* contains an illustrated account of a small ostrich-farm at South Head, where nine birds are kept. The methods of plucking and making-up the feathers are described and photographed. The annual product of each bird is worth from 10*l.* to 15*l.*; and the owner is of opinion that the industry is likely to prove a thriving one in the Colony. He considers that the birds, instead of being allowed to roam over large areas, as at the Cape, should be kept in small paddocks, and shifted from one to another of these at short intervals.

A PAPER by Mr. F. A. Lucas on the fossil bison of North America, published in the *Proc. U.S. Mus.*, vol. xxi., pp. 755–777, is specially noticeable for its wealth of illustration, having over twenty plates. The author, in opposition to some previous writers, is of opinion that all the bison skulls hitherto found in America are specifically distinct from the *Bos priscus* of Europe. No less than six extinct species are recognised; and while one of these is certainly a very distinct form, yet if all the others are valid species, it may be taken as certain that the fossil bison skulls of Europe would also permit of considerable specific division. One of the most important items in the paper is the determination that the so-called *Bos scaphoceras* of Cope, from Nicaragua, is not a bison at all, but a sheep. It seemed very strange that a representative of the former animals should have wandered so far south during the Pleistocene.

PERHAPS the most generally interesting article in the May number of the *American Naturalist* is one by Mr. Herrick, describing a case of the occurrence of a small hen's egg within one of ordinary size. Not that such abnormalities are uncommon—far from it. But the interest of the present case lies in the fact that the enclosed egg was situated in the yolk, instead of in the albumen of the larger specimen. In this respect it appears to be unique. The different types of such abnormalities are considered in detail. In ordinary cases, it seems that the small included egg represents a fragment of a normal ovum which has been ruptured, and has thus parted with some of its substance after leaving the ovary. Usually this fragment is treated in the oviduct like a full-sized egg and duly laid; but it may rarely be driven by antiperistaltic action up the tube so as to collide with the mother-egg, with which it fuses. From the general absence of yolks in such included small eggs, the ruptures that take place in the upper part of the oviduct must, as a rule, be confined to the albumen. Other explanations are given to account for double- or treble-yolked eggs.

IT is curious to note how the natural history of the fast-waning group of giant land tortoises is being gradually pieced together from the evidences of living specimens transported far from their original habitat. An instance of this is afforded by Mr. E. R. Waite's description in the last issue of the *Records of the Australian Museum* of a male and female of *Testudo nigrita* recently living in the grounds of the Gladesville Hospital, near Sydney. The female, which died in 1896, was brought from the Galapagos in 1853, and the male, which has been acquired by Mr. Walter Rothschild, about 1866. Unfortunately, in neither case is there any evidence as to the particular island in the Galapagos group from which they were obtained, so that the exact habitat of the species still remains unknown.

SPECIAL interest is naturally felt at the present time in the geology of many of the islands in the Malay Archipelago, and therefore the summary just published by Dr. B. Kotô, Professor of Geology at Tōkyō, will be of service (*Journ. College of Science*, Imp. Univ. of Tōkyō, Japan, vol. xi. part 2). The author acknowledges his indebtedness to the labours of Prof. Suess; but he gives additional information, his object being to compare the structure and physical features of Taiwan with those of the Far Eastern Indies. Brief references are made to a great variety of strata and to the volcanic phenomena.

WE have received the summary report of the Geological Survey of Canada for 1898, in which the Director, Dr. G. M. Dawson, records the progress of the Survey, and quotes from the reports of the several officers on the staff "the more important results of their investigations, particularly such as may be of immediate value to the public from an economic standpoint." In northern Alberta some further experimental borings have been made in search of petroleum, and great trouble has been experienced in the effort to penetrate the "tar-sands" at the base of the Cretaceous strata, owing to "the clotting of the casing and tools with the heavy tarry petroleum, or maltha, mixed with sand, which was thrown up by the discharge of gas." The indications of oil-bearing strata have been proved over a large area, and it is hoped that the liquid petroleum may be found in the Devonian limestones which underlie the Cretaceous rocks.

MR. R. G. MCCONNELL and Mr. J. B. Tyrrell's report on the Klondike Region, Yukon District, is referred to in the publication mentioned in the foregoing note. The productive part of the Klondike gold-field, as at present known, covers an area of one thousand square miles. The gold occurs in the gravels flooring the bottom of the valleys, in stream-terraces lining the lower slopes of the valleys, and in a remarkable moraine or glacial deposit that occurs along the slopes of Eldorado and Bonanza creeks. The gold has been derived from the rocks of the immediate vicinity, and these consist of schists probably of Cambrian age. In various regions the want of good topographical surveys is a sad hindrance to the geological work, but that this is carried on in various portions of the vast territory of Canada with great energy and enthusiasm is evident from the details enumerated in this report of the Canadian Geological Survey. There are numerous observations on petrology, palæontology, and natural history generally. A large number of reptilian remains have been obtained from the Belly River formation in the Red Deer River district. The age of the formation, judged by the invertebrate fauna, is considered by Mr. Whiteaves to be the same as that of the Laramie (Cretaceous) series.

IN NATURE for January 19 we gave a brief account of the progress of the Maryland Geological Survey, which is under the direction of Prof. W. B. Clark, State Geologist. We have since received the second volume issued by the Survey, which embodies the full reports to which we previously alluded. As in the case of the first volume, it is beautifully printed and handsomely illustrated. The coloured plates picturing the macroscopic appearance of various granites and the Potomac marble are particularly good. There are, moreover, numerous pictorial views of quarries and of the physical features; there are excellent topographic and geological maps, and reproductions of some of the earlier topographic maps dating from 1527. The volume is mainly occupied (1) with an account of the building and decorative stones of Maryland, by Mr. G. P. Merrill and Mr. E. B. Mathews, by whom the physical, chemical, and economic properties of the stones, and their distribution, are very fully considered; and (2) by a report on the cartography of Maryland by Mr. H. Gannett and Mr. E. B. Mathews, who deal with the aims and objects of cartography, and with the maps and map-makers of Maryland.

MR. G. K. GILBERT describes a "Bowlder-Pavement" (to use the American spelling) at Wilson village, about twelve miles east of Niagara river, New York (*Journal of Geology*, Nov.-Dec. 1898). Such a pavement is formed when the boulders in till or boulder-clay are grouped in an approximately horizontal plane, and are striated on their upper surfaces in a common direction. The features are indicative of local glacial action which has affected a previously accumulated till, this action having removed a certain amount of material and caused the pressing down and striation of boulders along the plane of erosion.

IN treating of the glacial sculpture in Western New York (*Bull. Geol. Soc. America*, March), Mr. Gilbert shows how the broad plateau of Niagara limestone was but little modified, while its escarpment was rendered more prominent owing to the excavation by ice of the underlying shales which occupy the lowlands. Mr. Gilbert draws attention to a flexure produced by ice-action in the Medina shales at Thirty-mile Point, New York; and in a subsequent article he describes some giant ripple-marks in the Medina sandstones of New York, and these suggest that the formation was laid down in a large ocean whose waters were agitated by storm waves sixty feet high.

MR. G. CLARKE NUTTALL contributes to the current number of *The Contemporary Review* a popular account of the dependence of the flavour of tobacco upon the activity of bacteria during that important stage in the preparation of tobacco known as fermentation. Interesting reference is made to the work of Suchsland, who examined the germs which he found in the fermenting heaps of the finest West Indian tobacco. This German bacteriologist isolated and cultivated these bacteria, and then introduced some into quantities of inferior German tobacco, which was subsequently transformed so that connoisseurs could not distinguish it from the finest brands of tobacco.

WE have received from Messrs. Dulau and Co. a copious list of books and papers in British botany offered for sale.

COURSES of instruction in cryptogamic and cytological botany are given at the Marine Biological Laboratory, Woods Hole, Mass., during July and the early part of August.

HERR J. DÖRFLER, the compiler of the *Botanists' Directory*, proposes to publish a new edition about the commencement of the year 1900, and desires the co-operation of the botanists of all countries. His address is Barichgasse 36, Vienna IV.

A CIRCULAR has been issued inviting the attention of biologists to the biological station at Ambleteuse, in the Department of Pas-de-Calais, France. It has been erected very much on the plan of the American station at Wood's Hole, and is primarily designed as a summer school for biological students in connection with the Catholic University of Lille.

THE Reading College Agricultural Department has just issued its Fifth Annual Report on Field Experiments for 1898. The experiments were carried on with the co-operation of the County

Councils of Berkshire, Oxfordshire, Dorsetshire, and Hampshire, subsidies being granted by these bodies to the College to meet the expenses. The experiments were chiefly concerned with manuring and the rotation of crops, and furnished results which ought to be useful to farmers. Only one disease of cultivated crops, the "finger-and-toe," appears to have been attacked. Experiments on the cultivation of the sugar-beet in the neighbourhood of Reading gave good results. We notice that the staff of the College engaged on the field experimental work comprised two lecturers in agriculture, a lecturer in chemistry, an assistant chemist, a lecturer in geology and meteorology, and the director of the agricultural department, but no botanist or entomologist.

Many admirers of Tyndall's writings will be pleased to know that the volume entitled "Hours of Exercise in the Alps," which has been out of print for some years—the last edition (the third) having appeared so far back as 1873—has been reprinted. Many adventures in the Alps and elsewhere are narrated therein, and the volume has as much freshness and vigour now as ever it had. Messrs. Longmans, Green, and Co. are the publishers.

A new volume of the "Year-Book of the Scientific and Learned Societies of Great Britain and Ireland" has just been published by Messrs. Charles Griffin and Co. The volume contains, not only particulars as to officers, meetings, and membership of learned societies, but also lists of papers read before, or published by, every Society of importance throughout the kingdom during 1898. As a convenient work of reference, the volume only needs to be known to be used.

The current number of the *Photogram* contains as a supplement a very excellent reproduction of a snow scene, entitled "A Winter's Night," on special rough velox paper. The same number also contains the spectrum of iron and the solar comparison (on a slightly reduced scale), which has recently been obtained direct on a film thirty inches long at one exposure at the Solar Physics Observatory, South Kensington.

As Rugby was the first of the Public Schools to afford facilities for the study of science, we look to the Natural History Society of the School for a good report; and the one just issued is not disappointing. A prize essay, by Mr. P. H. Bahr, on "The Birds of Staffordshire and North Wales," is included in the report, together with reports on the work of various sections, and Mr. G. M. Seabroke's report on the observations made at the Temple Observatory in 1898.

The course of study in technical electricity, arranged by M. Eric Gerard for the Montefiore Electro-technical Institute of the University of Liége, formed the basis of a volume of "Leçons sur l'Electricité" written by M. Gerard, and published several years ago by MM. Gauthier Villars et Fils. The first volume of the sixth edition of this work has just been received. The subjects dealt with are the theory of electricity and magnetism, electro-magnetic induction, electrical measurements, thermo-electricity, dynamo-electric machines, transformers and alternating currents. Many changes have necessarily been made in order to include some of the more important inventions and discoveries of the past few years. The volume now runs into 819 pp., and is illustrated with 388 figures.

Many practical hints for photographers are given by Dr. E. Vogel in his "Taschenbuch der praktischen Photographie," the sixth revised and enlarged edition of which has just been published by the firm of Gustav Schmidt, Berlin. Among the additions to the volume is a description of the preparation of, and printing with, potassium bichromate paper (Gummidruck). Concise notes on the materials and methods available for the production of good negatives and various kinds of prints form a characteristic of this photographer's pocket-book.—Another photographic publication just published by the firm of Gustav Schmidt is a new part of the fourth edition of the late Dr. H. W. Vogel's "Handbuch der Photographie," edited by P. Hanneke. The subject of the new section is photographic printing by different kinds of processes.

"Picture Taking and Picturing Making" is the title of a neat and clearly printed little book of 115 pages, published by the Eastman Kodak Company. The object of this guide, as we may call it, is not to deluge the reader with theories and technicalities of photographic optics and formulæ, but to state clearly the main features regarding the production of good negatives, prints, and lantern slides. Parts of the book are somewhat familiar, in that they have appeared in the small Kodak manual; but the reader will find much that is new and useful. Needless to say, there are numerous and well-reproduced illustrations.

In the "Year-Book of Photography and Amateurs' Guide" the reader will find that the 650 pages of which it is composed contain a mine of information that should be of the greatest service to the photographer, whether he be amateur or professional. The five sections of the book, which bring before us progress and practice, being a collection of helpful articles by practical photographers, the tourists' companion and holiday guide from the photographic point of view, winter work, facts and formulæ, and, lastly, novelties of the year, contain useful and valuable information suitable for every one. Not less important is the collection of fine reproductions from negatives, on many different subjects, taken with several kinds of cameras and shutters, which lends an additional charm to this year's volume. The author has succeeded in presenting his readers with, not only an interesting volume to read, but one that should be at the side of every amateur for reference.

A second edition of "The Aborigines of Tasmania," by Mr. H. Ling Roth, has been published by Messrs. F. King and Sons, Halifax. In a supplementary note to the preface, Prof. E. B. Tylor points out that since the publication of the first edition, nine years ago, noteworthy progress has been made in the anthropological study of the Tasmanians. He adds, "That these rude savages remained within the present century representatives of the immensely ancient Palæolithic period, has become an admitted fact. . . . That the workmanship of the Tasmanians may be generally taken as below that of the Palæolithic Drift and Cave men, is apparent from the absence of any Tasmanian implement comparable to the symmetrical pointed picks worked on both sides, characteristic of the Mammoth Period in Europe." The additional information and figures referring to the position of the Tasmanians in the history of the human race make Mr. Ling Roth's volume of exceptional interest to students of anthropology.

The additions to the Zoological Society's Gardens during the past week include a Sooty Mangabey (*Cercocebus fuliginosus*, ♀) from West Africa, presented by Mr. G. Le Tantt; a Bonnet Monkey (*Macacus sinicus*, ♀) from India, presented by Mrs. C. Tarrant; two Slender Loris (*Loris gracilis*) from Ceylon, presented by Mr. Stanley S. Flower; a Leopard (*Felis pardus*, ♂) from Ceylon, presented by Mr. Edward Booth; a Black-backed Jackal (*Canis mesomelas*) from South Africa, presented by Mr. David D. Keith; a Two-spotted Paradoxure (*Nandinia binotata*) from West Africa, presented by Mr. Arthur Knights; a Vervet Monkey (*Cercopithecus lalandii*) from South Africa, presented by Mr. G. Marson; a Brown Gannet (*Sula leucogastra*) from Accra, presented by Miss Williams; a White-backed Piping Crow (*Gymnorhina leuconota*) from Australia, presented by Mr. G. T. Harris; two Common Vipers (*Vipera berus*) from Hampshire, presented by Mr. Chas.

C. Dallas; an Algerian Skink (*Eumeces algeriensis*) from North Africa, presented by Mr. R. H. Archer; a Rufescent Snake (*Leptodira hotambaeia*), a Hissing Sand Snake (*Psammophis sibilans*) from South Africa, presented by Mr. W. Champion; three Barbary Turtle Doves (*Turtur risorius*) from Africa, presented by Colonel E. J. Gardiner; three Blue-necked Cassowaries (*Casuarius intensus*) from New Guinea, a Senegal Parrot (*Paeocephalus senegalensis*) from West Africa, two Mute Swans (*Cygnus olor*, 2 ♂), European; an Echidna (*Echidna hystrix*) from New South Wales, deposited; a Hunting Crow (*Cissa venatoria*) from India, three Bar-tailed Godwits (*Limosa lapponica*), four Black-tailed Godwits (*Limosa aegocephala*), ten Green Lizards (*Lacerta viridis*), four Toads (*Bombinator bombinus*), European, purchased; a Japanese Deer (*Cervus sika*, ♂), an English Wild Cow (*Bos taurus*), two Squirrel-like Phalangers (*Petaurus sciureus*, 2 ♀), two Short-headed Phalangers (*Petaurus breviceps*, 2 ♂), a Patagonian Cavy (*Dolichotus patachonica*), a Crested Porcupine (*Hystrix cristata*), a Hybrid Lemur (between *Lemur macaco* and *Lemur brunneus*), born in the Gardens.

OUR ASTRONOMICAL COLUMN.

Tempel's Comet (1873 II.)—Continued from *Astr. Nach.* (Bd. 149, No. 3554).

Ephemeris for 12h. Paris Mean Time.

1899.	R.A. h.	m.	s.	Decl. °	′	″	Br.
June 15	19	54	47·2	− 5	12	25	
16		56	11·5	5	22	24	
17		57	35·4	5	33	2	1·829
18	19	58	58·9	5	44	20	
19	20	0	21·9	5	56	19	
20		1	44·5	6	8	59	
21		3	6·7	6	22	21	2·048
22		4	28·5	6	36	27	
23		5	49·8	6	51	16	
24		7	10·7	7	6	49	
25	20	8	31·1	− 7	23	7	2·281

The comet is now more than four times as bright as when it was first re-observed by Prof. Perrine at Lick on May 6. Perihelion passage occurs on the 18th inst. During the period included in the above ephemeris the comet travels from the south-eastern part of Aquila to the north-west of Capricornus, being about 5° due north of α Capricorni on the 25th.

Return of Comet Holmes (1892 III.).—Continued from *Astr. Nach.* (Bd. 149, No. 3553).

Ephemeris for 12h. Greenwich Mean Time.

1899.	R.A. h.	m.	s.	Decl. °	′	″	Br.
June 15	1	22	38·3	+ 18	47	18	0·0341
17		22	56·5	19	23	22	
19		29	13·8	19	59	19	
21		32	29·9	20	35	8	0·0351
23		35	44·9	21	10	50	
25		38	58·8	21	46	25	
27		42	11·4	22	21	51	0·0362
29	1	45	22·7	+ 22	57	10	

During the above period the comet moves from near η Piscium to about 2 degrees north of β Arietis.

A telegram from Kiel, dated June 12, announces the first detection of this comet by Prof. Perrine at the Lick Observatory. The observation was made on June 10, at 15h. 2·2m. Lick Mean Time, the recorded position being

R.A. = 1h. 15m. 32s.
Decl. = + 17° 29′ 39″,

which will be seen to be fairly in agreement with the computed position. The comet is described as being very faint.

Comet 1899 *a* (Swift).—A circular from the Central Bureau at Kiel calls attention to the importance of the increase of brightness of this comet, which was recorded by several observers on June 4 last. Herr Kreutz has received a telegram from Herr Pokrowsky, of Dorpat, stating that communications received by him from Vienna, Bamburg and Hamburg, confirm the fact that on June 4 a decided brightening of this comet took place. The increase of magnitude was from 6 on June 2nd and 3rd to $5\frac{1}{3}$ on the 4th. A telegram also from Herr Hartwig gives further details. "The nucleus was of 9·5 magnitude, the total brightness being of magnitude 5. Greatest diameter of Coma about 9′; increase of brightness undoubted."

Another, from Herr Schorr, states: "Strong eccentric fixed star-like nucleus of 6·5 magnitude. Total brightness of comet 5 magnitude. Coma 9′ in diameter."

It will also be remembered that there was a decided increase in brightness of this comet from May 9 to 23, after which it gradually began to decline until the above sudden change was noted.

White Spot on Jupiter.—Herr Ph. Fauth, writing from a private observatory at Landstuhl to *Astr. Nach.* (Bd. 149, No. 3570), announces the observation on several occasions of a brilliant white spot on the north-eastern belt of the planet. The marking was observed to pass central meridian on May 8 at 11h. 25m., and on May 18 at 9h. 33m. It is about 4″ in diameter. The observations were made with a telescope of 7 inches aperture.

Two New Variable Stars.—M. Luizet, of the Lyons Observatory, announces in *Astr. Nach.* (Bd. 149, No. 3570) his observations leading to the discovery of two new variable stars in the constellations Vulpecula and Cygnus respectively.

The first is U Vulpeculae,

$$\text{B.D.} + 20^\circ{\cdot}4200.\quad \left.\begin{array}{l}\text{R.A.} = 19\text{h. } 30\text{m. } 17{\cdot}3\text{s.}\\ \text{Decl.} = +\,20^\circ\ \ 0'{\cdot}8.\end{array}\right\}1855{\cdot}0.$$

Four comparison stars were used and forty-three observations made during the period August 4 to December 26, 1898. These observations after reduction are plotted as the light curve, which is symmetrical and similar to that of ζ Geminorum. A maximum was found to fall on the date

1898 October, 21·61 Paris Mean Time,

and this in conjunction with a previously observed maximum by MM. Müller and Kempf,

1897 October, 2·4765 Paris Mean Time,

gives the period as

8·003 days.

The elements of the star U Vulpeculæ are therefore adopted as

1897 October, 2·4765 Paris M.T. + 8·003d. E.

The second variable is S U Cygni, the position being

$$\text{B.D.} + 28^\circ{\cdot}3460.\quad \left.\begin{array}{l}\text{R.A.} = 19\text{h. } 39\text{m. } 1{\cdot}0\text{s.}\\ \text{Decl.} = +\,28^\circ\ \ 54'{\cdot}9.\end{array}\right\}1855{\cdot}0.$$

Fifty-eight observations of this star were made from July 9 to December 26, 1898, and the results again plotted to give the light curve.

The period is determined to be

3·846d.,

and succeeding maxima may be calculated from the elements:

1897 October, 4·6665 Paris M.T. + 3·846d. E.

This star has a light curve showing an *irregular* decrease of brightness from maximum during about 2·7d., and a more regular increase during 1·1d., these features showing the variability to be somewhat analogous to that of δ Cephei.

THE BORE AT MONCTON, BAY OF FUNDY.[1]

MONCTON is situated on the Petitcodiac River, nineteen miles above the mouth of the Petitcodiac, where it enters the Bay of Fundy. This part of the river is more correctly an estuary which continues thirteen miles further up, as far as Salisbury Junction. At high tide the river at Moncton forms a sheet of water half a mile in width, while at low tide it consists of mud banks and flats, with a stream about 500 feet wide

---

[1] Abridged by Prof. G. H. Darwin from an advance copy of the Report for 1898 of the Tidal Department of the Survey of Canada, sent by Mr. W. Bell Dawson.